UNDP

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ENGLISH

APPROVAL OF UNDP ASSISTANCE TO A GLOBAL PROJECT
(GLO/91/014) - Reducing Pesticide Use for Maize by Improved Insect Resistance Based on Bacillus Thuringiensis Toxin Genes (CIMMYT)

Date of approval by the AC: 1/	29 January 1992
Expected duration:	Five years
Proposed executing agency:	UNDP/OPS
Proposed UNDP contribution:	$6 250 000
Source of funds:	Global IPF

Project background

Maize is a staple cereal for people throughout the world and ranks third in importance after wheat and rice in annual production. Data on 29 major maize producing countries of the developing world indicate that 55 percent of the total area is seriously affected by insect pests. Field and storage pests typically cause losses of 20 percent or more in developing countries. Global chemical control of maize insect pests is estimated to cost more than (US) $3 billion per year.

Synthetic chemical control of insects is a threat to human health and the environment. Thus, there is a growing awareness of the potential hazards associated with the formulation, manufacture, transport, mixing, application and disposal of synthetic chemical pesticides, and agreement on the need for alternative control technologies.

Private companies in the industrialized world have invested millions to develop genetic engineering techniques for temperate maize improvement. These recent advances in biotechnology will expand the pool of genes available to temperate maize breeders. However, realizing the promise of this technology in tropical maize in developing countries implies a sizable resource investment. Furthermore, collaborative research involving both public and private sector entities is required.

Description of project

The goal of this project is to transform tropical maize in order to increase sustainable production and significantly reduce the need for synthetic chemical pesticides in the developing world. The project will use advanced technology from public and private sources to generate tropical maize germplasm that has enhanced and durable resistance to major insect pests of maize and to provide the improved germplasm to breeders and farmers in developing countries. The strategy will be to strengthen the resistance genes already available from various maize sources by the addition of genes from the soil bacterium Bacillus Thuringiensis (B.T.).

1/ This Fact Sheet reflects the status of the project/revision at the time it was approved by the Action Committee; modifications to the project/revision may have occurred subsequently.

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CIMMYT will enter into arrangements with individual collaborators based on research results, performance, new developments in biotechnology, and within the national guidelines and regulations for the development, testing and release of the products of genetic engineering. Certain advanced laboratories in developing country programmes will assist CIMMYT, such as the National Maize and Sorghum Research Centre (CNPMS) of the Brazillian Agricultural Research Enterprise (EMBRAPA) and the Centre for Research and Advanced Studies (CINVESTAV) of the Mexican National Polytechnic Institute and CIRAD (France). In addition, the private sector will participate.

The immediate objectives of the project are to: (a) identify at least three B. thuringiensis (B.T.) strains that harbour endotoxin genes with effective insecticide action against the major lepidopteran insect pests of tropical maize; (b) identify, characterize and isolate the genes encoding specific B.t. crystal proteins with high levels of toxicity for maize insect pests; (c) prepare gene constructs that allow the expression of crystal protein genes in transgenic maize; and (e) introduce and express the B.t. genes in tropical maize plants.

It is expected that, by the end of the project CIMMYT will have fertile maize plants that contain genes encoding the endotoxin of Bacillus thuringiensis and which express sufficient levels of this protein to confer significant resistance to the major lepidopteran insect pests of tropical maize. A project oversight committee will be appointed that will include UNDP and invited outside consultants (expert on biotechnology, environmental regulations, R&D management). The Committee will be appointed by CIMMYT in consultation with the Administrator of UNDP; and the group will meet annually to review and approve the research plans for the following year. Specific review and approval recommendations of all sub-contracts by the oversight committee is also envisioned.

Inputs

UNDP contribution will be used for supporting collaborative efforts with public institutions in Mexico and Brazil and with private biotechnology companies. CIMMYT will direct and coordinate the project with the assistance of an international oversight committee.

Financial data

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Personnel	1 672 000
Research	3 459 000
Equipment	480 000
Miscellaneous	389 000
Direct cost*	250 000
Total	6 250 000

* The UNDP direct costs will be used in monitoring the progress of the collaborative effort and an end of project evaluation. In addition, it is anticipated that other countries, donors and institutions may wish to associate themselves with the project or initiate parallel efforts, and informal consultations and workshops area anticipated.

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